FY20 RARE Project 2146: Migration of PFOA and HFPO-DA from Contaminated Surface Soils to Surface and Groundwater Near a Fluorochemical Production Facility

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Background

- PFAS (per- and polyfluorinated alkyl substances) are highly stable and unreactive, which makes them desirable in the production of commercial applications
- In recent years, manufacturers have replaced long chain PFASs with short chain and polyether PFASs, including hexafluoropropylene oxide dimer acid (HFPO-DA or "GenX")
- A fluoropolymer production facility outside of Parkersburg, West Virginia has historically used PFOA in its manufacturing processes until switching to HFPO-DA in 2013
- A recent publication by EPA researchers and Ohio State University collaborators demonstrated widespread PFOA and HFPO-DA concentrations in surface waters around the facility*

*Galloway, J.E., Moreno, A.V.P., Lindstrom, A.B., Strynar, M.J., Newton, S., May, A.A., Weavers, L.K. 2020. Evidence of air dispersion: HFPO-DA and PFOA in Ohio and West Virginia surface water and soil near a fluoropolymer production facility. *Environ. Sci. Tech.* 54(12):7175-7184. https://doi.org/10.1021/acs.est.9b07384.

Project Objectives

- Systematically characterize soil PFAS contamination in areas impacted by emissions from the facility
- Systematically characterize PFAS concentrations in surface water and groundwater and their relationship to areas with documented soil contamination
- Develop a baseline measurement of other PFAS chemicals that may be present in drinking water

EPA United States Environmental Protection Agency

Motivation

- PFOA is found in many drinking water sources throughout this region, but the full geographical range remains poorly described
- HFPO-DA has been used as a replacement processing aid since 2013 and it has recently been found in some groundwater samples in a small-scale investigation conducted by Chemours in 2018 (10 homes & 4 public water providers evaluated) at the request of EPA
- Questions remain about the extent of HFPO-DA contamination in surface soils and the rate at which it is mobilized to drinking water resources

Potential Impacts

- Demonstrate spatial occurrence of PFAS
- Evaluate migration routes of PFAS from known sources
- Estimate where and when HFPO-DA might impact drinking water sources
- Could be used as scientific basis for regulatory compliance
- Approach could be used to investigate other locations with PFAS contamination

Roles

- ORD
  - Quality Assurance Project Plan
  - Geospatial analysis of historical data
  - Laboratory sample analysis
  - Webinar presentation of results
  - Manuscript preparation
- Region 3
  - Field sample collection
  - Communicate with WV DEP and DOH and any local entities/property owners
- Region 5
  - Provide historical data and associated QA documentation
  - Communicate with OH EPA and DOH and any local entities/property owners
- All
  - Study design and plan
  - Communications plan

Status to date

- Project kick-off – March 15, 2020
- Develop draft project sampling plan – May 12, 2020
- Hire ORISE post-doc (Theresa Cantu Guillette) – May 22, 2020
- Initiate regular biweekly team meetings – June 17, 2020
- Bring in ORD/Regional communications – August 26, 2020
- Connect with Region 3 field sampling branch – September 10, 2020
- Prepare for meetings with state partners – August 2020
- Initiate development of QAPP – September 2020
- Communications team meeting – September 22, 2020

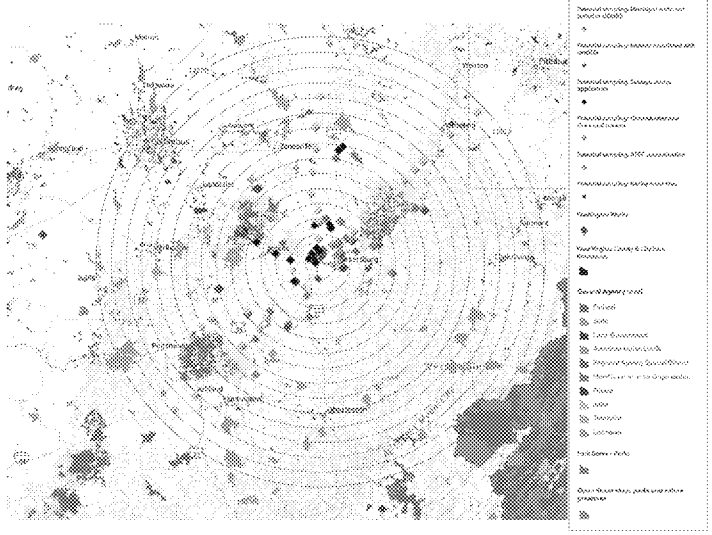
Approach

- Assess historical DuPont/Chemours data (2002-2018) from the Facility and surrounding area
- Use internal GeoPFAS GIS mapping tool to develop hypotheses and draft sampling plan
- Partner with local entities to use on-the-ground knowledge to refine sampling plan and achieve their objectives
- Collect field samples
- Analyze field samples
- Report results
- Generate scientific publication

Sampling Hypotheses/Areas of Investigation

- Determine extent of impacts from airborne emissions
- Sampling of small municipal public water systems
- Impacts associated with landfills
- Sewage sludge application areas
- Groundwater near contaminated rivers and streams
- The influence of Aqueous Film-Forming Foam (AFFF)

Potential Sampling Sites



Summary

- Sampling plan includes over 100 sites for water, soil, and vegetation
- Utilize established analytical methods for quantification of method 537.1 PFAS compounds
- Utilize non-targeted analysis (NTA) high resolution mass spectrometry to characterize additional PFAS
- Understand the extent of PFAS contamination within the environment

Communications Plan

- Communication Meeting (PADS, RSL, CPHEA/ORD) Sept. 22 to discuss **near-term communication goals**
  - Develop and support awareness messaging to EPA offices/programs (OW, OLEM, SSWR, etc.)
  - Support project briefing to Ohio Department of Health/West Virginia Department of Environmental Protection as needed
  - Develop draft messaging for state partners (Ohio and West Virginia) for sampling awareness (prior to and during sampling activities)
    - Draft messaging for local governments, communities and property owners where sampling will take place
  - Establish platform for communication transparency during the project activities
    - Develop feedback channel for open communication and timely response to questions

Next Steps

1. Finalize the project Study Plan after input from the Ohio Department of Health and West Virginia Department of Environmental Protection including selection of sampling sites, collection periods, roles and responsibilities (provides the basis for the QAPP and other study related documentation) (10/20/20).
2. Develop project-specific Quality Assurance Project Plan (QAPP) (12/01/20).
3. Review and approval of QAPP by ORD (12/15/20).
4. Collect preliminary soil, water, vegetation, and sediment samples from one or more locations for method development purposes (completed by 12/31/20).
5. Collect soil, water, vegetation, and sediment samples from locations specified in Study Plan (completed by 06/01/21).
6. Finalize analysis of study samples in ORD laboratories (09/01/21).
7. Synthesize results, generate report, and submit findings to peer-reviewed journal (completed by 3/14/22).